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PLASTICS

A Periodical Devoted to the Manufacture and Use of Composition Products

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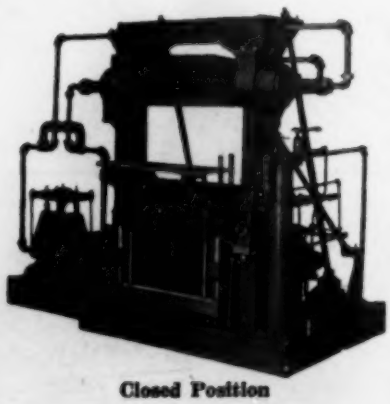

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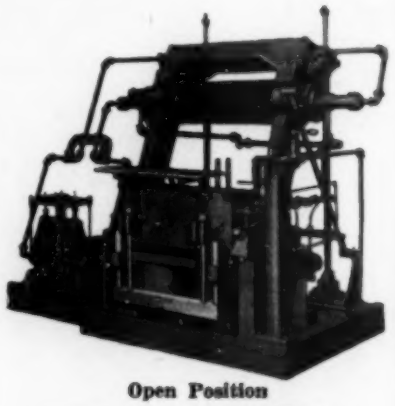

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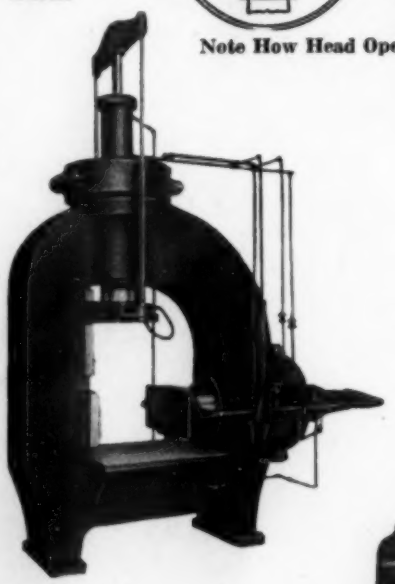

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THE functions of a business paper are many and manifold. It will consistently comb the field for new manufacturing ideas. It will gather trade news and events, sifting the important from the obvious puff. It will discuss future developments in the field and show the possibilities of new raw materials and equipment. It will present translations of foreign articles as well as abstracts and reviews of technical literature.

In fact it has so many and varied duties that a page could be filled describing them. But PLASTICS more than all these has done one other thing that stands out.

It has co-ordinated an industry.

Usually a trade paper finds a ready made field with clearly defined lines in which it can function. PLASTICS found no such clear cut line of demarkation. It had to gather the scattered and conflicting products that would make a unit of the plastic industry.

Not only did it do this but it had to consistently keep on acting as the clearing house and meeting place for information on all matters of interest to each portion of its field.

Performing this efficiently it has obtained and held the interest of the important men in this growing industry.

By doing this PLASTICS has built a reader interest that is comparable to a twenty year old publication. The inquiring letters are evidence of its value to subscribers and it fills the need for an informative central station.

Naturally all this reacts to the benefit of the advertiser in the publication and would be of inestimable help to those manufacturers planning to sell the plastic market.

The Publishers.

PLASTICS

A periodical devoted to the manufacture and use of plastic and composition products

Vol. 2 MAY, 1926 No. 5

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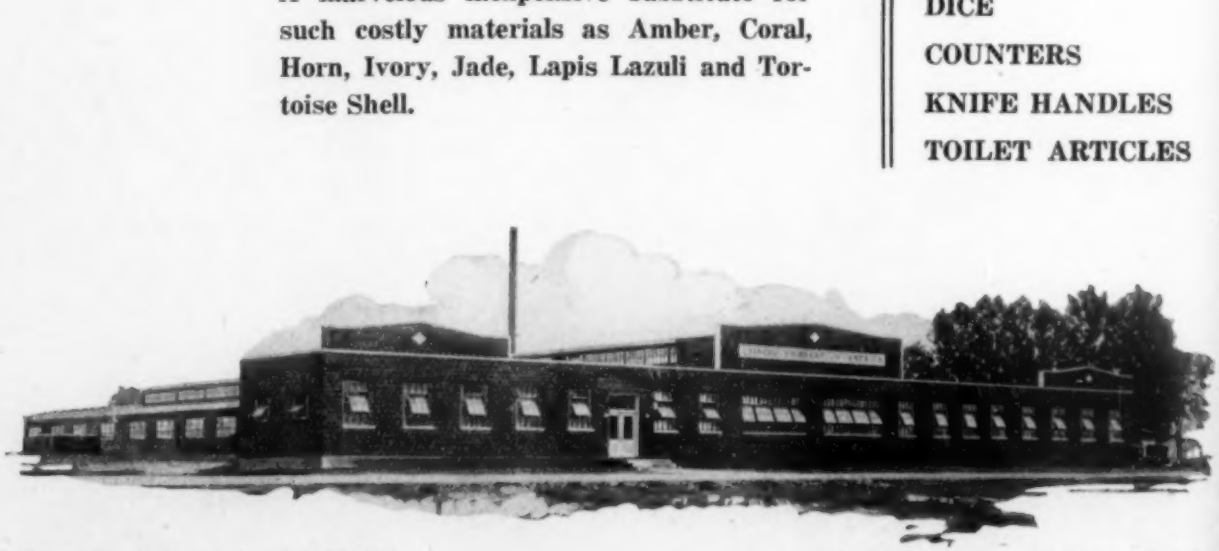

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PLASTICS

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Vol. 2 MAY, 1926 No. 5

The Successful Hobbing of Dies

Duplicate dies can be prepared from a hardened steel replica of the article to be molded

By W. E. Rahm

Chief Engineer, The Burroughs Co.

BRIEFLY defined, hobbing is the production of dies in metal by the impression of a hob, hydraulic power being employed. The hob is a duplicate in hardened tool steel of the object to be molded in the hobbed die.

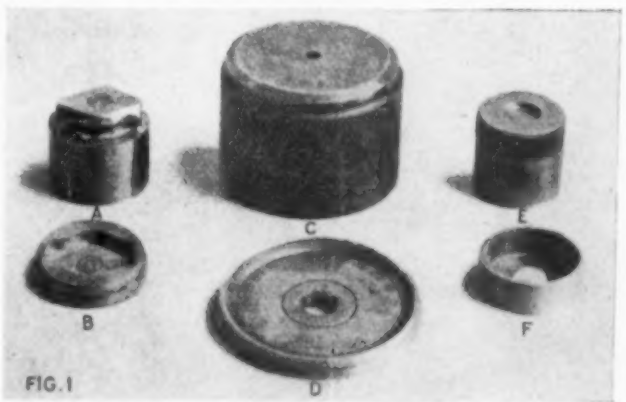


FIG. 1

It is obvious that hobbed dies, molds, cavities or impressions, as they are variously termed, outclass by their advantages those produced by the usual machining methods. The more important of these advantages are: Accuracy of reproduction as to size and perfection of finish of the molded objects; less cost per cavity where many impressions are required; convenient replacement of broken dies; rapid heating and cooling, and the elimination of mold handling by pressmen when suitably mounted thus increasing output of goods at lower labor cost.

These advantages will be made clear by contrasting machined and hobbed molds in a few characteristic mold problems discussed below.

Advantages of Hobbing

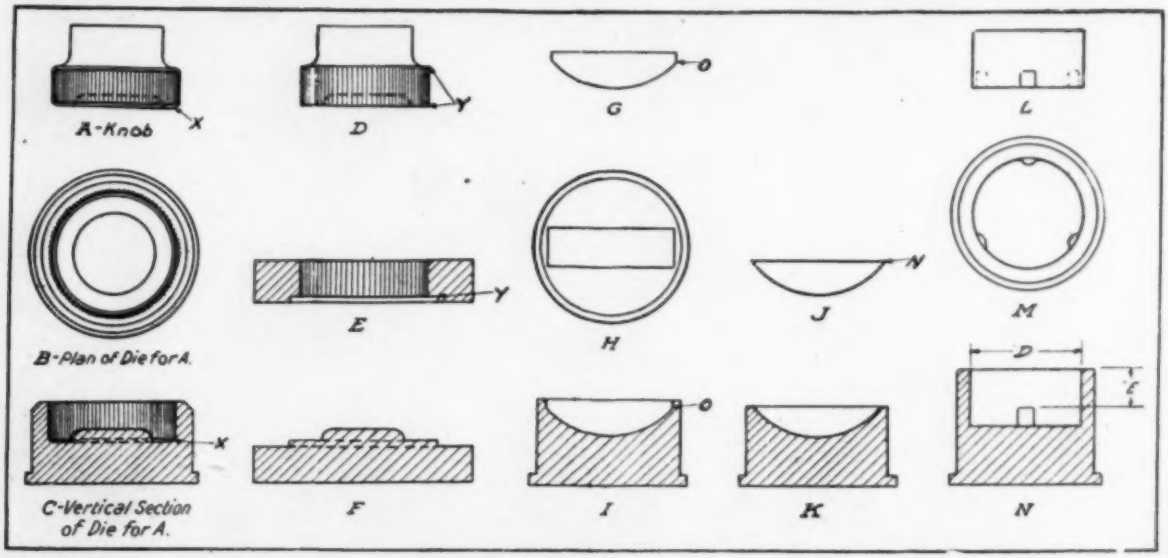
The most satisfactory solution of the multiple cavity mold problem is to hob the impressions wherever this is practicable. The art of cold hobbing dies is not as generally understood as it deserves to be, probably because with the ordinary methods of molding slow curing material only a few dies or impressions are used. Machining was resorted to because the outlay for an hydraulic equipment for hobbing only a few dies a year would not return a profit on the investment. Also, hobbing is work for skilled mechanics and operators.

It is not the purpose of this article to describe hobbing methods in detail. This is next to an impossibility, for each hobbing job is a problem in itself requiring individual thought for solution. The methods used on any previous hobbing job are not always an indication of what may have to be done on the next one to attain success.

Steels for Hob and Die

Two factors enter into successful hobbing. The first is a hardened tool steel with or without engraving, made with proper contour and preferably with a slight taper or draft. It must have highly polished surfaces and no upper cuts. Surface scratches and marks of every kind must be removed. Even a piece of lint between the hob and impression will be found to have left its imprint after the hobbing operation. No oil or lubricant should be used between hob and die if a high luster is desired.

The second factor comprises the blanks for the impressions; these should be made from a low carbon machinery steel and annealed before using. Generally the stock received from the jobber is of unknown quality and may contain hard spots. The more thorough the annealing and the softer the blank the less pressure is required to sink the hob. A few points variation of carbon content in the steel may increase the pressure required to hob by 100 per cent and the results will be unsatisfactory due to the poor flowing quality of the steel. It is possible to hob well annealed tool steels within certain limits but they do not lend themselves readily to deep hobbing because of their poor flowing quality.



Pressure for Hobbing

Pressure required for hobbing varies from 50 tons to 200 tons per square inch depending upon the method adopted. A blank or impression which is confined within a chase ring might require for machinery steel approximately 100 tons per square inch. The same blank stock of larger diameter but unconfined would probably hob readily at 50 tons per square inch. It would be found, however, that the piece hobbed in the chase would be true to the size of the hob, whereas the piece hobbed unconfined would be loose on the hob, due to the fact that the metal flows away from the hob while being sunk. The amount of this spread is dependent largely upon the shape of the hob and the amount of stock in the excess diameter left to withstand the lateral pressure. In case of articles requiring exact duplication and accuracy of size such as in molded plastic work, the method of open hobbing cannot be used.

Hobbing Without Chase

Hobbing an unconfined piece also has the disadvantage that if the hob has any projections or bosses these are apt to be sheared off by the spreading of the blank. When hobbing a large piece with a press which has too small a capacity for the work it is often necessary to anneal the die or impression several times before it is finally carried to its proper depth. Repeated annealing has a decided disadvantage because wherever the hob stops and starts again a slight wave or ridge will show on the periphery or diameter of the impression for each successive operation. The only successful way to overcome this defect is to use a press of sufficient capacity to sink the hob at a single pressing. Every hobbing job is virtually a problem by itself and it is necessary on each one to determine by trial the exact shape and size of blank required to obtain the desired results.

Types of Hobs and Dies

Two series of master hobs and the corresponding dies made from them are shown in Figs. 1 and 2. Examination of these figures make evident the mechanical impracticability and the prohibitive cost of producing, by ordinary machine work, duplicates of any of the pieces shown, particularly when it is remembered that each is made in a single piece. Referring to Fig. 1, the hob A and corresponding die B illustrates this point very clearly, as do all the others.

For example, D in Fig. 1 is a 4-inch radio graduated dial impression. To make this by machining methods it would be necessary to relieve and mill away all surfaces of the impression ex-

(*Contd. on page 168*)

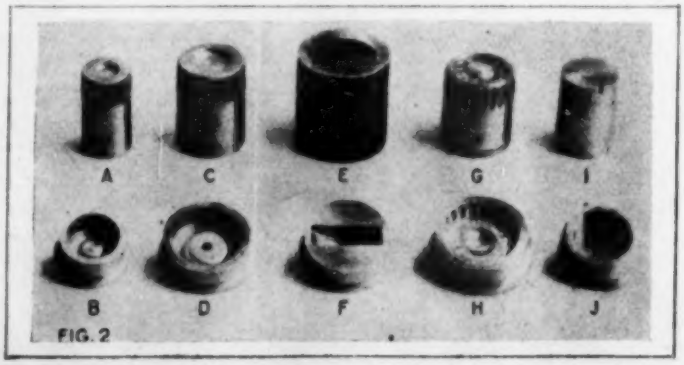


FIGURE 2

Production of Electrical Insulation

An outline of the general methods of manufacture of molded products

By Werner Urbanus

From Kunststoffe 1925, 15, 189 and 209

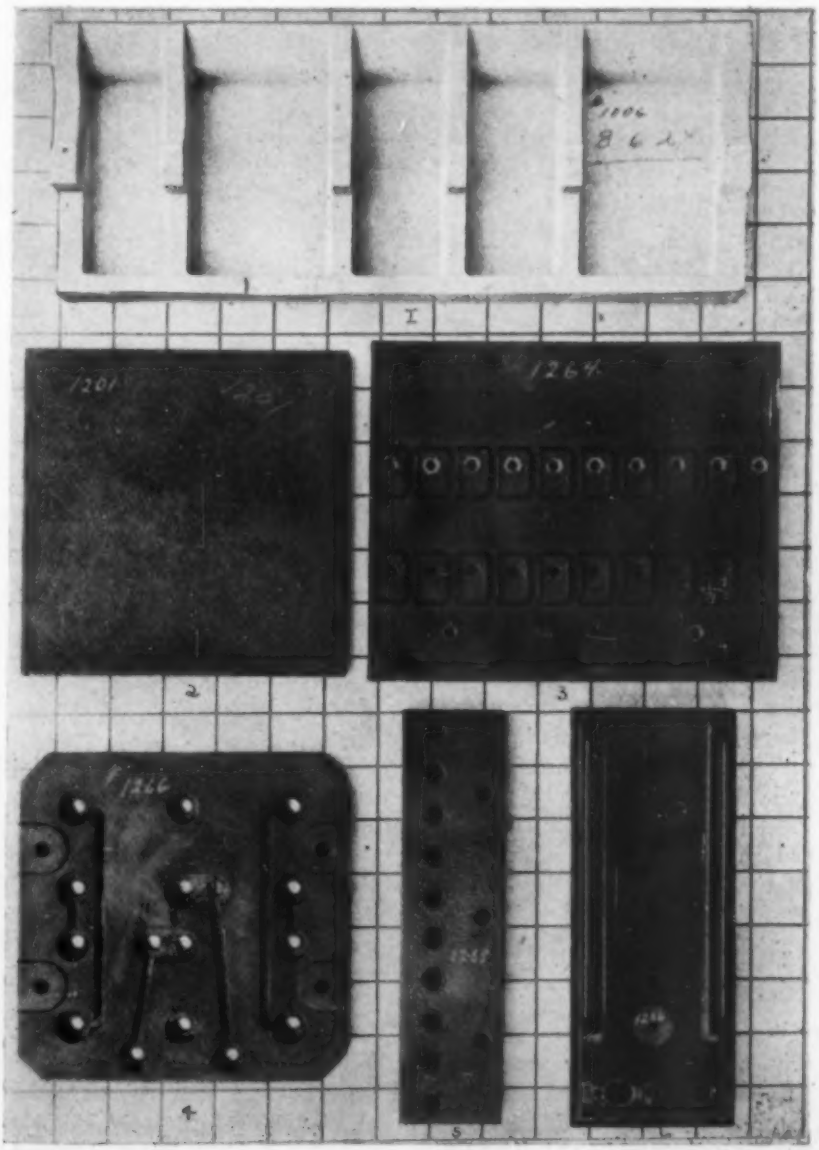
THE formulae and methods proposed for the manufacture of artificial materials are characterized by their great diversity. The entire field has not as yet been explored in a scientific way, and most of the work done in it is purely empirical. With the exception of a few outstanding achievements, no sign of systematic work on insulating material is in evidence. To give a coherent and logical review of such materials is likewise almost an impossibiity, due to the large number of substances and methods proposed.

In the present essay only a small field of synthetic substances is to be reviewed, limiting the discussion entirely to the pressed electric insulating materials, that is to say, such artificial or composition products as can be commercially produced by molding and pressing.

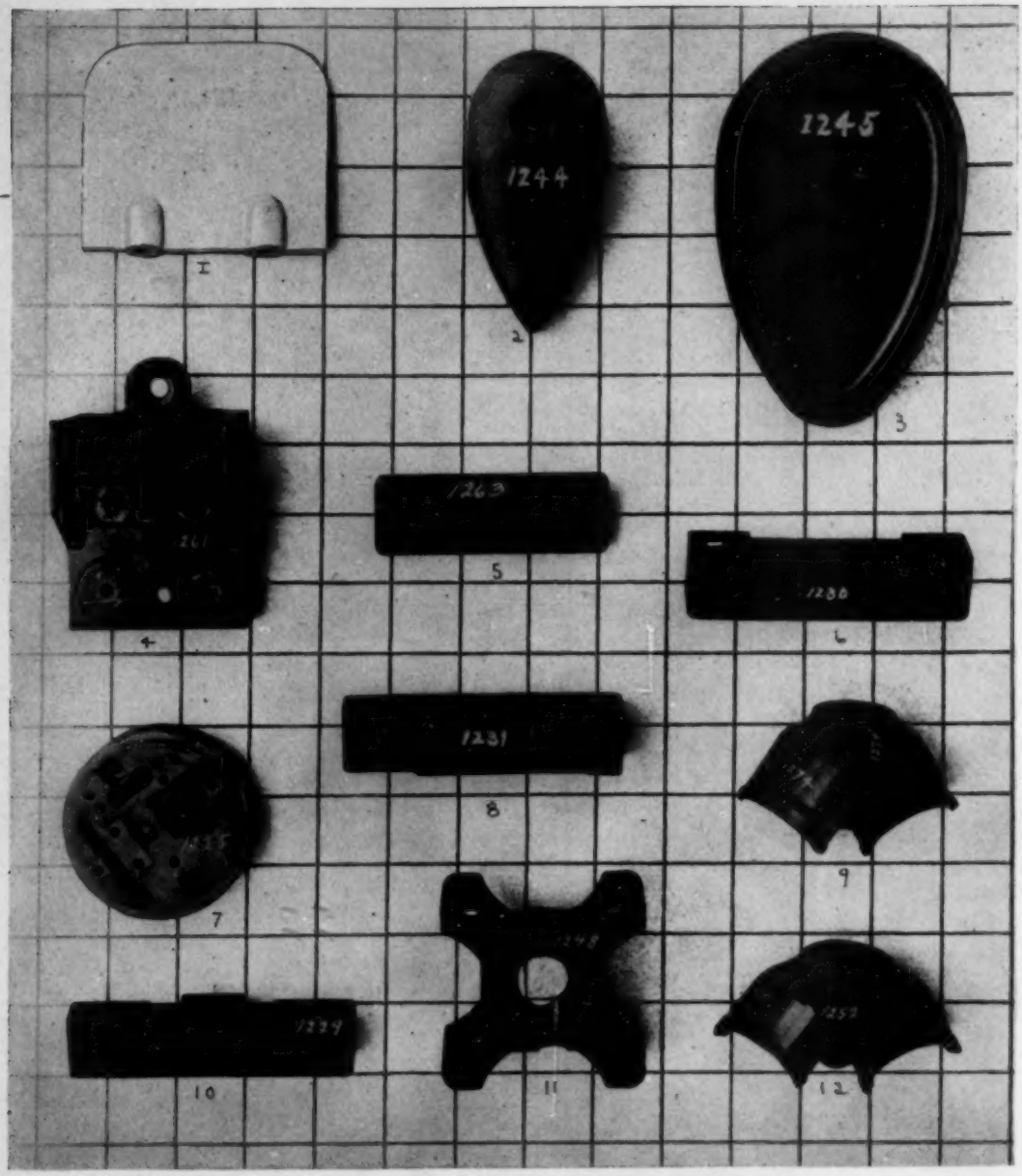
The fundamentals of electrical insulating materials are these: two main ingredients are present in every case, one the binder or agglomerating agent, and secondly, a filler which not only serves to cheapen the material but endows it with the requisite hardness and resistance to mechanical influences. With a wide choice of materials, insulating bodies of almost any desired property can be obtained. Obviously one of the chief considerations are the insulating power of the binder and its resistance to moisture.

The methods used for incorporating the binders with the fillers differ considerably, and will be taken up in due course. In most cases the general process of forming the insulating materials consists in pressing

The continually expanding electrical industries, and the electrification of the home, lead to an increased demand for insulating material. Mass production makes molding practically the only means for meeting the demand. The following comprehensive review of the art of producing such insulating material, although written from the German standpoint, will, undoubtedly make interesting reading for our subscribers.



The diversity of electrical insulating materials is plainly shown by the above.



Complicated shapes can be made more quickly by molding than by other means. The squares on the illustration are one inch

the same in heated molds, using either toggle, excentric, or hydraulic presses. The manufacture of cold molded goods was described in PLASTICS for April 1926, p. 117.

As the binders are by far the more important of the ingredients, and as they give the insulating material its general character, the choice of the binder shall act as a sort of guide in classifying the various insulating materials.

The oldest methods made use of natural substances as binders, or else such artificial products as are readily manufactured from natural substances. Examples are tar and asphalt, hard pitch, certain natural resins, hydrocarbons, waxes, and sulfur.

The most primitive method consists in employing a hard pitch with mineral fillers, such as, for example, chalk, ground slate, clay or quartz, the material being formed or molded in heated dies. An alternative method is to heat the mass to the state at which it will flow more or less freely under pressure and then to mold the same in cold dies.

It should be quite obvious that such materials, although it will take the proper shape and outline without much difficulty, will suffer many defects, such as lack of uniformity, and that it will also be quite likely to be adversely affected by changes in temperature.

A much better method of mixing binders and fillers, and producing a more or less homogeneous molding-mass, is to mix the fillers in a suitable kneading or malaxating apparatus with pitch, asphalt, resin or the like at a temperature at which the binder will be in a viscous condition, afterwards rolling out the stiff dough of hot binder and filler into strips or plates, and which can be cut into pieces of the right weight to form the individual objects which are to be molded. Material thus formed can be allowed to cool until brittle and ground up quite fine, the resulting powder being then used for molding the insulating objects.

Incorporating the Binder

No matter how thorough the mixing of the binder and filler may be, and even though the rolling and kneading may be continued for a long time, there will nevertheless be one difficulty that can not very well be overcome. And that consists in the fact that the materials, will after all, be a mere mechanical mixture, with particles of filler here and particles of binder

there, without any true impregnation of the pores of the filling material, which is highly desirable when a truly homogeneous material is desired.

Furthermore, most fillers, and some binders, contain a certain amount of moisture, and that is quite difficult to remove, and which obviously will interfere with the full electrical insulating efficiency of the product.

Therefore a very much better method of incorporating fillers and binders consists in dissolving the binders in a suitable solvent, mixing the fillers with this solution, and then heating the solution until all of the moisture is driven off, finally heating to a point where the solvent also will be expelled, finally leaving the filler and binder incorporated most intimately with each other. This method has found practical application and is giving most excellent results.

A specific example may be interesting. Pitch or asphalt, fillers or mineral matter, and benzene (or trichloroethylene if fire hazard is to be limited), are brought together in a mixing kettle which is provided with filling openings, discharge valves, and a closed cover and stirring apparatus. The apparatus should be steam or oil jacketed for heating. After the pitch has become thoroughly dissolved and the mass of filler has been stirred smoothly into the solution, the kettle is heated with steam or with the oil in the jacket. As the benzene or trichloroethylene begins to boil and distill off, it will mechanically carry off all the moisture both in the filler and in the binder, the complete removal of the solvent (benzene or trichloroethylene) being effected by the use of a vacuum pump. The benzene or other solvent, and the water, are condensed and led into receiving vessels, where the water and solvent will separate by gravity.

The mixing and boiling away of the solvent will take several hours, and as the mixing apparatus has been kept going throughout the process, the resultant mixture of binder and binder-impregnated filler will be most complete and thorough. When no more solvent or water vapors come from the kettle, the vacuum is broken and the kettle emptied. The insulating mass can then be rolled out, or allowed to harden and be crushed and ground up. In either case it is suitable for molding.

This, in short, is the essential method. The choice of binders is, however, quite wide, and depends a good deal upon the use to which the insulating materials are to be put. Among the tar products, anthracite and bituminous coal tar, wood tar are characteristic; bituminous and anthracite pitches, wood pitch, montan-wax pitch, Gilsonite asphalt and softer bitumens have distinct valuable properties; the resins are exemplified by rosin, shellac and copal, and the waxes by ozokerite, ceresin and even bees-wax.

(*Continued in June issue*)

Italy Reports Progress in Celluloid

Recently founded industry is showing healthy growth and gives promise of stability

JUST about a year has now passed since the first Italian factory for the manufacture of raw celluloid has taken up production. For many years all raw celluloid was imported, mostly from Germany and France.

The present plant is the indirect result of negotiations between French and Italian interests. The Italian firms which interested themselves are the Societa anonima Esplodenti Prodotti chimica of Villafranca, the firm of Bombrini Parodi Delfino and the Societa Italiana Esplodenti.

The machinery originally ordered in France failed to be delivered and for a time it seemed as though the project would fall through. The energetic efforts of Dr. Silvio Mazzucchelli, who operates a large celluloid comb factory at Castiglione Olona finally put the plant into operation.

Operations Begun

Foreign experts and workmen were imported in 1922 to teach the Italians, and in April 1924, actual manufacture of raw celluloid began. The capital of the newly formed Societa Italiana della Celluloide was originally 5 million lire, but was soon increased to 10 million. The plant, located at Castiglione Olona, consists of twenty separate buildings, spaced quite a distance from each other to minimize the fire risk, but connected by subterranean passages 700 meters long, which also carry all steam, water and electric and communication lines. Acid and alcohol pipes also lead to all the buildings, a 45 H. P. centrifugal pump furnishing adequate water in case of a conflagration.

The present capacity of the factory is 2000 kilograms of raw celluloid per day, but it is planned to increase this to 6000 kilograms daily. The latter would represent about three times the normal Italian demand. (From the Giornale di Chimica industriale ed applicata, 1925, No. 10).

Low Viscosity Nitrocellulose Preparation

A number of recent patents disclose methods of treating pyroxylin waste

WITHIN the past few years there has been a greatly increased demand for cellulose nitrate lacquers for finishing automobiles and furniture, in place of varnish.

That pyroxylin scrap or waste can be utilized for the production of these lacquers is evidenced by the increasing number of patents which are issuing covering the manipulation of the waste to render the same amenable to the manipulations of the lacquer maker, and to provide a cellulose nitrate of sufficiently low viscosity to allow of the preparation of solutions of sufficient strength to give the desired heavy coatings.

Recent Patents

A recent patent assigned to the Eastman Kodak Co. is U. S. Pat. 1,564,689, granted December 8th on application of Neil S. Kocher and Victor E. Kimmel. This patent covers the method of reducing the viscosity characteristics of nitrocellulose, particularly of film scrap and pyroxylin waste, and specifically for the purpose of making lacquers from the same.

The method employed is to treat the pyroxylin scrap with solutions of strong mineral acids and potassium chlorate. One bath that has been found to be particularly useful consists of an aqueous solution of hydrochloric acid containing 36% of absolute HCl and about one-tenth of one percent of potassium chlorate. Another equally suitable bath is a 65% solution of nitric acid containing one-tenth percent potassium chlorate.

The duration of the treatment varies, and the time to end it is preferably determined by tests. Representative samples of material are taken from time to time, washed, dried and dissolved in order to test their viscosity characteristics. In general the time of treatment will be decreased with increased concentration of acid, with increasing concentration of the chlorate, by using cellulose nitrate of medium viscosity at the start of the process, and by increasing the temperature of bath.

Partial Denitration

During the action of the acid on the pyroxlyin material, a mild denitration takes place, but the reduction in viscosity reaches the desired state before the denitration has proceeded to a harmful extent. In general it is preferred not to reduce the nitrogen percentage below 9.5%.

When the action of the bath is complete, it is drained off from the material, and the latter is thoroughly washed, preferably with water at 75°C for several days, or even a week, as every last trace of acid must be removed.

Use of Pyridine

Still another method of decreasing the viscosity of cellulose nitrate derived from film scrap and pyroxylin plastic waste is to treat the material with pyridine. As this however leaves the material with a very strong and disagreeable odor, methods had to be evolved to remove the pyridine from the substance after treatment. Such a method is the subject of U. S. Patent 1,564,765, Dec. 8, 1925 to Leon W. Eberlin, assigned to the Eastman Kodak Co.

The pyroxylin scrap which has previously been treated with pyridine, is immersed in a 20% aqueous solution of acetone, and chlorine gas is allowed to bubblue through the mixture until the smell of chlorine persists and all of the pyridine has been decomposed and thus eliminated.

When the action is finished, the pyroxylin is subjected to a bath of a chlorine-destroying agent, preferably with sodium thiosulfate (common photographers' "hypo"), in solution from 5 to 10% strength. Final washing with several changes of cold water is all that is required to complete the process.

As several well-organized concerns are now handling pyroxylin and film scrap, and as the use of cellulose nitrate lacquers is beginning to be better appreciated, further developments along the line of utilization of plastic waste will be looked forward to with considerable interest.

Nitrogen Tetroxide

Another patent by Samuel E. Sheppard and Leon W. Eberlin, U. S. Patent 1,572,248, Feb. 9, 1926 describes a method of treating film scrap, after the gelatin layers have been removed, and while in comminuted condition, with gases such as "nitrogen peroxide" (should read nitrogen tetroxide to conform to standard chemical usages). As little as three hours exposure to a medium concentration of this gas are said to suffice to lower the viscosity of the pyroxylin contained in the scrap. The material is thoroughly washed before dissolving.

A second patent by the same inventors, U. S. P. 1,572,249, Feb. 9, 1926, describes the treatment of film scrap with a 3% solution of common hydrogen peroxide (hydrogen dioxide, H_2O_2) for 24 hours at

room temperature. The process is said to be also applicable to nitrated cellulose in the fibrous state. A thorough washing completes the process. Object of these treatments is to get a certain amount of oxidation, coupled with reduction of the size of the cellulose nitrate molecule.

Depolymerizing

This idea of depolymerizing the cellulose complex in the pyroxylin is carried further in a subsequent patent, this time the invention of Leonard E. Branchen, U. S. Patent 1,572,-266, Feb. 99, 1926. In this case the pyroxylin scrap, such as film, is first softened in a solution which exerts a partial solvent action upon the material, as a mixture of methyl alcohol (methanol) and water or denatured alcohol and water, in the proportion of 95% of the alcohol and 5% of water. This will thoroughly soften up the film without actually causing it to dissolve. While in this condition the material is treated with a 2%, solution of sodium carbonate in water, and chlorine gas is bubbled in. As is well known, this will give rise to sodium hypochlorite, or common bleaching solution, which oxidizes the pyroxlyin in the same way as the nitrogen tetroxide and the hydrogen dioxide of the preceding patents. A 24 hour treatment is recommended. An alternative claim is for the treatment of the softened material with an alkaline solution only.

Quite evidently however, they prefer to operate with the alkali and chlorine both. Before attempting to dissolve the thus prepared pyroxylin, it is thoroughly washed with hot water, and then dried.

The growing popularity of the pyroxylin finishes should assure a steady and stable market for all such classes of pyroxylin scrap as lend themselves to the above processes.

New Type of High Pressure Valve

An innovation in the high pressure valve field has been introduced by the Hydraulic Press Manufacturing Company.

For years engineers experimented, designing innumerable seat and disc combinations in the search for a valve that would successfuly withstand high pressure and high temperature conditions. Practically everything offered on the market was subjected to prolonged and exacting tests.

The result is represented in the new Forgsteel valve. This valve is of a straight way type and is constructed of forged steel. This permits of a valve body of uniform section throughout, doing away with unequal expansion or contraction.

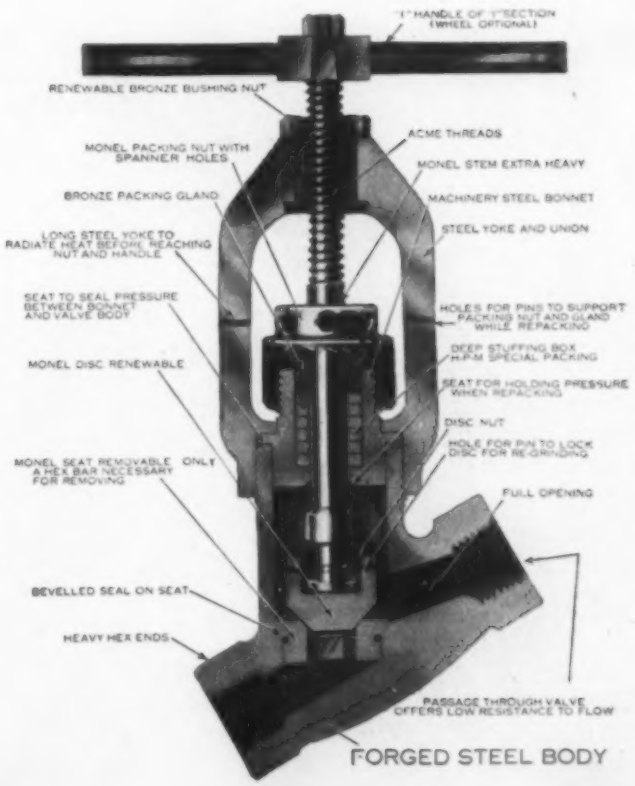
Full opening is provided for the steam flow. The path of this flow is confined to as few angles as is possible with a valve made from a steel forging. This reduces friction losses to the minimum.

The seat disc and stem are of non-corroding, acid resisting steel or Monel. The wire drawing is eliminated and this valve is tight after cooling even if it is shut while hot.

The operating man will find the packing space an interesting feature of the Forgsteel valve. Ample packing space is provided and the valve can be repacked in five minutes without disturbing operating conditions. The packing nut is of Monel metal.

The yoke is of steel, an added factor for safety and efficiency. The design of the valve provides a stem which is out of the ordinary because of its size. Acme threads assure a real grip and great strength.

The Forgsteel valve is designed exclusively for high temperature and high pressure work being built to stand up under the most severe service conditions.


RENEWABLE BRONZE BUSHING NUT
MONEL PACKING NUT WITH SPANNER HOLES
BRONZE PACKING GLAND
LONG STEEL YOKE TO RADIATE HEAT BEFORE REACHING NUT AND HANDLE
SEAT TO SEAL PRESSURE BETWEEN BONNET AND VALVE BODY
MONEL DISC RENEWABLE
MONEL SEAT REMOVABLE ONLY A HEX BAR NECESSARY FOR REMOVING
BEVELLED SEAL ON SEAT
HEAVY HEX ENDS
ACME THREADS
MONEL STEM EXTRA HEAVY
MACHINERY STEEL BONNET
STEEL YOKE AND UNION
HOLES FOR PINS TO SUPPORT PACKING NUT AND GLAND WHILE REPACKING
DEEP STUFFING BOX H.P.M SPECIAL PACKING
SEAT FOR HOLDING PRESSURE WHEN REPACKING
DISC NUT
HOLE FOR PIN TO LOCK DISC FOR RE-GRINDING
FULL OPENING
PASSAGE THROUGH VALVE OFFERS LOW RESISTANCE TO FLOW
FORGED STEEL BODY

The Forgsteel Valve provides free flow of steam. Monel metal disc and stem prevent excessive corrosion.

Working with Furfural Resins

Use of insoluble metallic soaps to prevent sticking to molds claimed

TREVOR S. HUXHAM, of Bloomfield, N. J. has assigned his rights under U. S. Patent 1,571,447, granted Feb. 2, 1926, to Carleton Ellis, of Montclair. This patent relates to the relatively new class of furfural resins, and methods for their preparation and molding. The inventor describes his discoveries as follows:

The addition of the insoluble metallic soap as a non-stick preparation is claimed in the eleven claims of the patent, and is the "nub" of the case. With the continuous cheapening of furfural it may soon be that these furfural resins will assume considerable importance in the industrial field.

This invention relates to a composition for molding and to the process of making same and relates especially to plastic compositions containing a binder derived by the reaction between an aldehyde and a phenol.

Greasing the Molds

In molding plastic substances such as those made from the resinous condensation products of phenol and formaldehyde difficulty arises from time to time due to sticking of the material to the mold. The cause of sticking has not been definitely established and not infrequently causes trouble in molding establishments. However by greasing the molds or by adding a small amount of stearic acid to the molding composition a degree of lubrication is obtained which overcomes sticking in some cases. The requirements of present day molding frequently call for a plastic material which will set or become thermo-rigid when hot pressed and may be taken from the mold

Recent research has made available increasing amounts of furfural, derived from corn cobs and oatmeal hulls.

As this material becomes cheaper, the furfural-phenol resins appear destined to play an increasingly important role.

in a cured condition just as rubber is vulcanized. If the article sticks to the mold delay arises and the mold afterward has to be repolished. It is possible to minimize sticking difficulties by chilling the article while still in the mold by placing in a cold press but this second operation consumes time and is not desired. Therefore a molding composition to be satisfactory should not give at the most more than very slight sticking difficulties.

Resins may be prepared by reacting with furfural on phenol and these resins may be admixed with fillers in the manner customary with the phenol formaldehyde products referred to above using for example any of the customary filling agents ordinarily employed in the plastic art. Wood flour being an example. The resinous material incorporated with filler to make a molding composition, even though it has the property of setting satisfactorily in the mold on heating and pressing, has the peculiarity of sticking to the mold to an inordinate degree. If this sticking were only slight such furfural resins might be more generally employed but even by using the hitherto employed mold lubricators, with their disadvantages of rendering the surface of the mloded article greasy, or by using stearic acid in the molding composition sticking difficulties are constantly in evidence.

In the manufacture of matrices or printing plates molding with furfural resin is possible because a sheet of tin foil is interposed between the mold and the molding composition and this prevents sticking. For the usual run of molded articles however no such means are at hand to prevent sticking and in the present invention a composition will be described which although containing or consisting of furfural resin does not stick to the mold at least in any degree such as to preclude it from being used for commercial molding purposes.

Metallic Soaps

The essential feature of the present invention is the incorporation in the molding composition containing resins which exhibit the sticking properties, for example the furfural resin of a small quantity of a metallic soap such as zinc stearate or aluminum palmitate and the like.

The term "metallic soap" has heretofore been used in the literature, as referring to the fatty acid or resin acid salts of the metals other than the alkali metals, such salts being insoluble in water (see for example page 266 of Ellis, Synthetic Resins and Their Plastics N. Y. 1923). The said term is employed in that sense in the present case, and is not intended to include water-soluble soaps such as ordinary soda or potash soaps.

Thus a resin may be made by

heating 10 pounds of phenol, 7½ pounds of furfural and 1 pound of potassium carbonate under a reflux condenser for 3 hours at 145—155° C. Any excess of phenol is then removed by blowing with steam. The solid fusible resin obtained is used as the basis of a molding composition. For example as follows:

Specific Examples

75 parts by weight of the resin are dissolved in an equal weight of denatured alcohol, incorporated with 7.5 parts hexamethylenetetramine, ⅜ths parts stearic acid, 1.5 parts nigrosine and 75 parts wood flour. The mixture is thoroughly dried and then is ground with about 5 parts of zinc stearate or aluminum palmitate.

"The method of incorporation of the metallic soap may be that of simply grinding the mixture in a ball mill with the metallic soap or the latter may be added at any other suitable stage in the operation, or precipitated on the filler or introduced during the manufacture of the molding composition in any other way and I do not limit myself to the precise manner of its introduction although I believe grinding the metallic soap with the molding composition otherwise finished for use each particle of the composition which is generally in powder form becomes floured or coated with the very fine particles of the metallic soap and that sticking is prevented because of this in more effective way than when the metallic soap is actually incorporated throughout the composition as for example by forming a true solution in the resin itself.

The exact amount of the metallic soap to employ varies with its nature and quality and is usually only a very few per cent of the total batch. For best results it should be very uniformly mixed in the batch. In a similar manner these agents which prevent sticking of the otherwise very obstinate furfural resin may likewise be applied to other plastic molding compositions containing synthetic resins which have a tendency to exhibit sticking qualities.

A complex resin made by the action of furfural and acetaldehyde on phenol when used in molding compositions may likewise have additions of one form or another of metallic soap. Although such complex resins made from aceteldehyde and furfural do not possess the characteristics either of the furfural resin or the acteldehyde resin but have properties significant of reaction during resinification in which the identity of the individual resins is lost so that I cannot call such a product a furfural resin, nevertheless a complex of this character used in a molding composition may at times show indication of sticking which may be corrected by the use of metallic soaps aforesaid.

Of course it is desirable to use a soap which is highly water insoluble in order not to affect the water resistance of the molded product.

Inventor's Statement

Having made a great many types of synthetic resins and having observed that of these the resins obtained by the action of furfural and phenol afford the greatest difficulty in molding because of the sticking troubles referred to I am able to state from such experience that the advantages of using metallic soaps to overcome the sticking are very pronounced and constitute a means for the wider utilization of such synthetic products.

The process of the present invention may be applied not only to molding compositions in powdered form but also to those used in sheet form or in other modifications."

Synthetic Perfume Resembling the Odor of Amber

Imitation amber is one of the uses of the synthetic resins, but suffers from the defect in that it does not have the characteristic odor of amber itself. In fact some of the cheaper amber imitations have a decided "chemical" odor that discloses their origin and detracts from their desirability.

This can now be remedied, as one Arnold Codti, of Switzerland has just obtained patent protection on a perfume smelling like amber. (U. S. Pat. 1,565,796, granted Dec. 15, 1925, and assigned to Chemical Works Flora, Switzerland).

While the inventor does not mention the product in the above connection, its use for the purpose would be indicated, and there is nothing in the patent that would prevent anyone from doing so, as the patent covers the perfume itself and not its uses.

The material is made by nitrating dibromobutyl-metacresol-methyl ether. 12.9 parts of this ether are dissolved in 40 parts of carbon tetrachloride nitrated with an acid mixture containing 15 parts of nitric acid (sp. gr. 1.51) and 15 parts of sulfuric acid, at a temperature from 5 to 10°C. The resulting product is crystallized from alcohol, and melts at about 100°C. The inventor calls it "nitro-dibromo-butyl-metacresomethyl-ether having a smell of musk, and a true smell of amber."

FARREL

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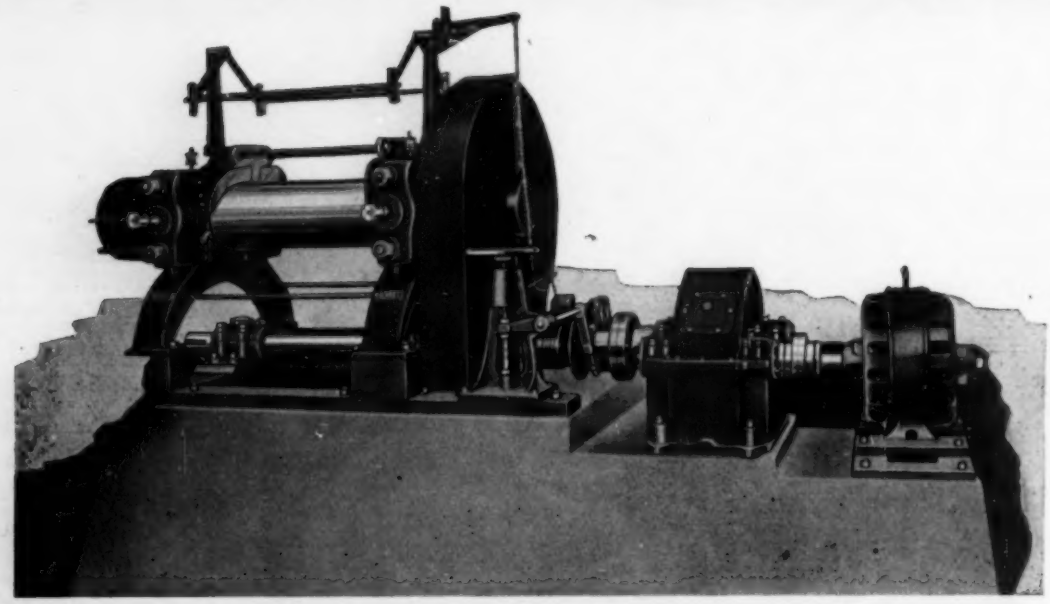

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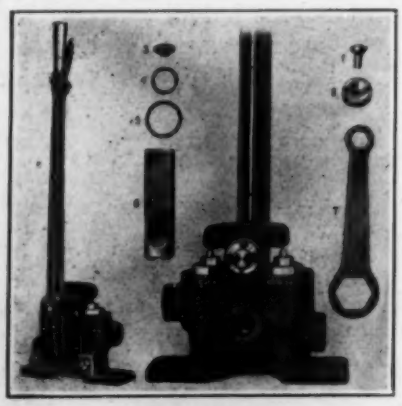

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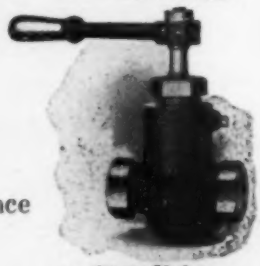

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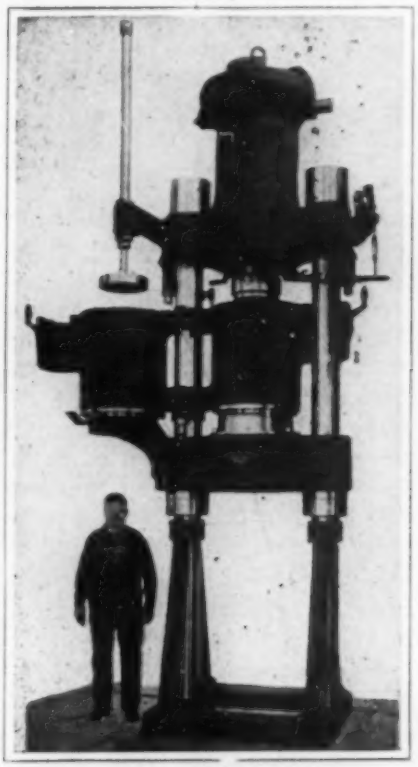

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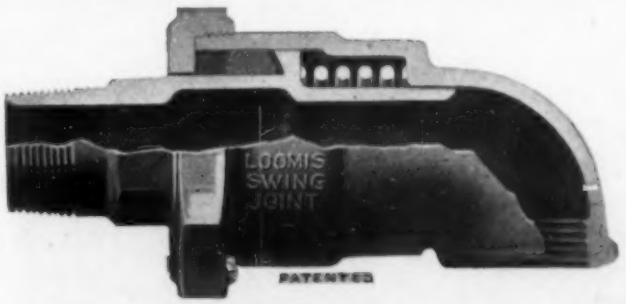

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EDITORIAL · IMPRESSIONS

Research Lights the Way

FOR centuries man was content to employ such raw materials as a bountiful nature had supplied him with. It is, of course, true that he modified the materials, and built up intricate structures from them, but in general, the improvement on what had gone before was trivial as compared with the physical and mechanical strides that characterized the 19th century.

The art of metallurgy was about the only branch of applied physics and rudimentary chemistry that had received the attention of investigators akin to our modern research workers, but even there the line of progress was mainly mechanical.

Industrial Research

It was not until the early years of the nineteenth century, about one hundred years ago, that modern chemistry began its triumphal march through the history of man's endeavors to make that which nature provided better suited for his needs and desires. It was the necessity for providing new materials required by the increasing complexity of national relationship that gave the required impetus. The increased contact with distant lands, due to transportation developments, provided new sources; but at the same time the cost involved in importation stimulated inventive genius to the devising of means of imitating nature's products, and, if possible of improving upon them. Thus what we are pleased to term "industrial research" was born.

While at first the efforts of the rapidly developing art of chemistry were directed to the elucidation of the difficult problems of the nature of matter—and which is, incidentally, not yet completely solved—the tremendous growth in the number of organic chemicals discovered and prepared during the second half of the past century opened up immense vistas for research.

New Fields Open

As new compounds were discovered and prepared, their application to industrial needs were studied. While at first perhaps merely a chemical curiosity, the same substance, in the hands of an investigator gifted with more than the usual amount of vision, became the raw material for a huge industry

In no field has this been more clearly demonstrated than in the modern one of thermoplastic materials. Gun-cotton, at first merely a new and powerful aid to warfare, became the raw material for the production of hundreds of thousands of useful articles for the peaceful arts—the medium for recording evanescent human events by photography and cinematography as well as mere articles of adornment. The "uncrystallizable and amorphous" resins that baffled the first discoverers of the phenol condensation products, became the building blocks from which modern chemists have erected the enduring structure of the synthetic resin art, with its infinite number of practical applications.

The larger companies are maintaining splendid research laboratories, especially such concerns as the Eastman Kodak Co. and the Bakelite Corporation. However, in other lines, money spent on research will surely pay handsome dividends.

PLASTICS

The New Paint

FOR centuries the art of decorating by means of paints and varnishes depended upon empirical methods of producing the materials used. While some progress was made in the compounding of the varnishes from natural oils and resins, no new substances were found, and the improvement was directed rather to the means of incorporating the gums and pigments.

Inorganic chemistry furnished new ways of making pigments, the most recent additions being lithopone and the titanium oxide pigments. However, only recently have synthetic resins been called upon for the preparation of lacquers and varnishes.

"Duco" and Pyroxylin

With the advent of phenol resins, especially of the oil soluble type, all this has changed. The greatest inovation, however, was the rapid rise in popularity of the cellulose nitrate lacquers or paints, popularly known as the "Duco" finish. Although this is a little beside the subject from a strictly "plastics" point of view, it nevertheless has a very important bearing on these materials. Recently methods have been perfected for the utilization of the waste and scrap celluloid type of plastics for the making of these paints; and the addition of brushing lacquers made from cellulose nitrate has made this class of coating material available to everyone.

The extreme durability and high luster of the pyroxylin lacquers makes them especially desirable.

It is not difficult to see that the value of scrap, especially clear and light colored, will be increased by this new use, and the developments in this field will be worth watching.

Pyroxylin Products Safe to Handle

Inflammability no greater than that of many of the common commodities

THE alleged danger of pyroxylin plastics has led, from time to time, to various investigations, some of which have had an official character. It is interesting in this connection to read of the opinion of German commercial interests and the way these products are handled on the railways of Germany. As is known, that country, up to the late war, led the world in chemical products and was looked up to in matters chemical.

German Opinions

According to an article in Die Gummi Zeitung, 1925, Vol. 40, page 62, further investigations have been made on the subject of the inflammability of commercial pyroxylin plastics, which in this case the Germans give the uniform appellation "Celluloid." Referring first to investigations dating back to 1913, and a further report of 1923, this journal, in substance, prints the following report of a western German technical laboratory:

"Recent experiments made with samples of raw celluloid, celluloid scrap and waste film, have definitely proven that even heating to 75 degrees Centigrade will not lead to spontaneous combustion. Of course, a stable and properly made celluloid is assumed. This is almost assured as all of the present manufacturers have completely solved the problem of stability. In general, waste film is somewhat more hazardous than other pyroxylin scrap. Usually this sort of waste material is shipped in paper cartons, and it is obvious that some method for diminishing the inflammability of the packing cases should be employed.

Finished articles of celluloid, such as balls, dolls, combs, etc, are usually shipped in corrugated paper cartons. Usually the individual articles are also wrapped in paper or with excelsior to prevent mechanical damage. Such packages can be considered sufficiently safe for freight shipments.

In a recent opinion rendered by an expert in some litigation, it was asserted that even insufficiently stabilized celluloid had a fairly high ignition temperature. Spontaneous combustion does not occur even with such material. One flagrant case in which incorrectly prepared celluloid led to a conflagration was found to be due to a material that was so very acid that the acid excuded from its pores, and, acting upon the packing material, gave rise to a decomposition that finally raised the temperature to the ignition point.

The pyroxylin products industry can serve its interests the best by continuously keeping before the public the fact that their manufactured articles are perfectly safe to ship and handle and are no more "explosive" than paper or wood.

Celluloid itself, when properly made, can be subjected to weak and even to some strong acids without being adversely affected thereby. Even poorly made celluloid can be subjected to temperatures of 50 deg. C for several days without untoward results. It is a well known fact in the industry, that fairly heavy celluloid sheets will not even ignite when a burning match is laid upon them. In the few cases in which shipments of celluloid have burned up in transit, it was not possible to show that the fire had had its origin in spontaneous combustion. When it is taken into consideration that the raw materials from which celloid are made are put through an elaborate stabilization process, and that the finished material is daily stamped, hot-pressed, cut by saws and on the lathe, blown into various shapes and twice polished by processes which surely led to local heating, it can not be truthfully claimed that the material is unduly inflammable.

Flame Only Danger

Actual open flame is necessary to set celluloid afire. But in this regard it is no more dangerous than straw, hay or paper.

The usual method of shipping celluloid, film and celluloid scrap (in Germany) is as follows: raw material is usually shipped packed in paper, with or without crates. More seldom it is enclosed in boxes or wrapped in jute. Considerable amounts are exported from Hamburg packed in packing cases of wood, lined with cardboard or oiled paper. In the case of carload lots, celluloid is usually shipped in closed cars, in boxes. Celluoid rods and rubes are usually loid rods and tubes are usually with jute.

The suggestion that fire-proof paper be used for wrapping, was answered by some manufacturers that celluloid was so safe that even pocket cigar lighters had beten made of it.

When no danger of spontaneous combustion exists, ordinary packing paper can be considered as sufficiently safe. Celluloid articles, packed in individual cartons, or in wooden boxes,

(*Continued on page 175*)

The Fabrication of Dressing Combs

The Completion of the Comb

By L. B. Kavanagh
President, Standard Tool Co.

THE manufacturer of dress-combs from horn stock has been described in detail in the October and December 1925, and February 1926 issues of this journal. The completion of the comb is taken up at this point.

The combs are now ready for "rubbing" on balls or wheels usually made of old woolen carpet cut into circular pieces about 18 inches in diameter with a hole in the center of each piece large enough for the Rubbing Spindle to pass through. A sufficient number of these together with about the same number of smaller circular pieces placed alternately as filling, so that the ball will not be too hard and solid, are clamped between the two flanges on the spindle to make a ball of from four to six inches in thickness. The face

Rubbing Tongs.

of the ball should then be turned off straight across to an even surface with a sharp knife. Corn Husks are frequently used instead of carpeting for making rubbing balls, and larger flanges which are corrugated are required on the Rubbing Spindles for holding them. The ends of the Rubbing Spindles are pointed and should run in the ends of hard wood plugs held by iron plug holders or double iron plug holders on a wooden frame that is about 32 inches in height. The operator stands and holds the work on the upper side of the ball while the under edge of it runs in a slush consisting of some gritty substance mixed with water held in a wooden box attached to the frame or supported underneath. Sifted hard coal ashes are generally preferred, but pumice stone or fine sand is sometimes used.

The operator can keep the surface of the ball coated by putting it on with his hand if the ball does not coat itself sufficiently.

(*Continued on page 176*)

Spindles for rubbing and polishing combs.

Rawle Resigns as President of the Celluloid Co.

As predicted in the April issue of PLASTICS, a Board of Directors representing a compromise between the reorganization element and the management of the Celluloid Company was chosen March 30th at the annual meeting. There was no opposition to this ticket, which was nominated by Julius Rippel.

At the same time the resignation of Henry Rawle, president of the company, was announced without comment. No president has been chosen as yet, to succeed the retiring Mr. Rawle. The directors are at present negotiating for the services of an experienced executive.

Mr. Heath, chairman of the Board and head of the executive committee supplemented his annual report by mildly criticing the reorganization committee for its assertion that "a rather serious condition exists" because of the passing of dividends on the preferred stock. The chairman said that big improvements had been made in economies and operations; that the company was financially sound and that he had great hopes for the development of several new articles.

In reply to questions by stockholders, Mr. Heath declared: That no bonuses were paid last year; that he knew nothing of stories that company secrets had been allowed to get to competitors; that no officer of the company was interested in the Johnson Realty Concern, a Florida enterprise to which was sold the realty in that state and on which an effort was made to grow camphor trees.

Committee Defends Itself

Mr. F. Hallet Lowell, a director, characterized the reorganization committee as "a lot of old women," insisting that their talk had caused measureless damage and greatly lowered the morale of the workers.

Mr. Rippel defended the committee on the ground that action was both advisable and

necessary in the present situation.

The following new directors were elected: Robert Campbell, of the Nairn Linoleum Works, William F. Hoffman of the American Oil Supply Company, Julius Rippel, and Henry B. Rogers of the Edison Lamp Works; Carleton Montgomery and Warren Sillcocks who were directors before last year, were chosen and the following were re-elected: Arthur O. Choate, Walter C. Heath, Joseph La Rocque, Marshall C. Lefferts, and F. Hallet Lowell.

Educational Supplies

School and university supplies form a good outlet for pyroxylin plastic material. Among the more common articles may be mentioned: celluloid slates, note-pads, penholders, mechanical pencils, pencil boxes, rulers (both opaque and transparent), triangles and French curves, erasing stencils, door protectors, sponge cups, Gem-clip trays, chalk holders, slide-rules, coverings for self-erasing note pads and the like.

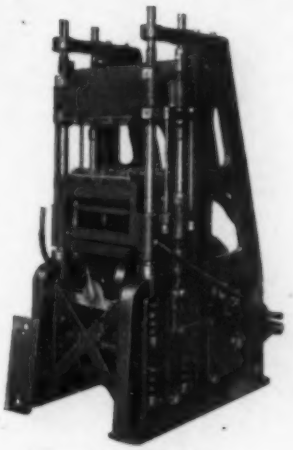
Cuba Taxes Celluloid Goods

According to a recent decision of the Cuban government, celluloid goods are classed among luxuries and must pay an additional 10% duty. This includes such material as natural horn, whale bone, celluloid, cinematographic film and pyroxylin plastic material in general.

Celluloid Buttons

Mr. Posner, general manager of the Belmont Button Works, 329 East 29 Street, reports that there has been a steady increase in the celluloid button business of the firm.

Big Prize Contest in June



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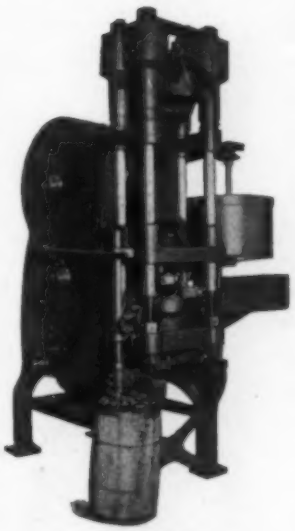

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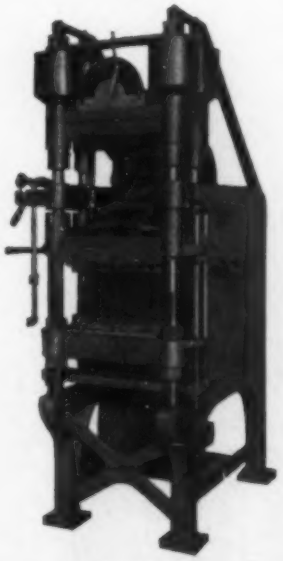

Model A-1

The Molding Machine Presses

with the Controlled Spring Pressure

The greatest sensation of the plastic industry.

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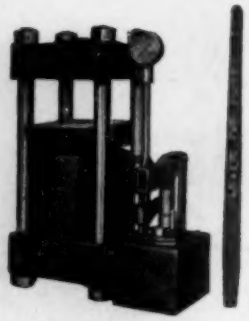
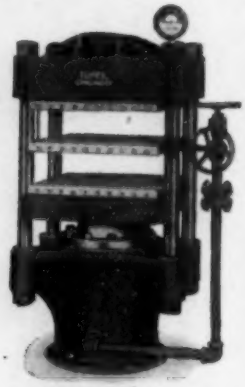
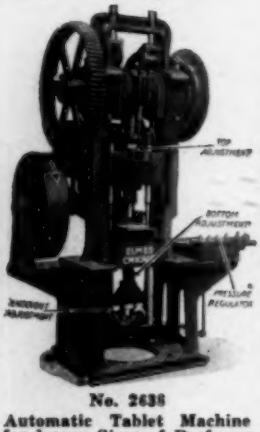


No. 319
Laboratory Testing and Forming Press. For Molding, we can Equip with Intermediate Hot Plates.

No. 2693
Patented Fool-Proof Control

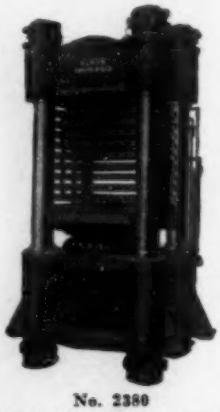


No. 2793
Heating and Chilling Unit Built to suit specifications.



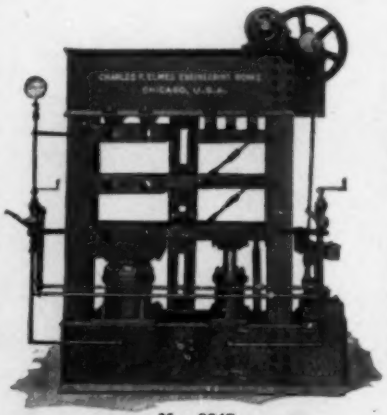
No. 2638
Automatic Tablet Machine for larger Sizes of Preforms From Powdered Materials.

Semi - Automatic Press No. 2693 is the only design of press where knockouts are returned without moving the press ram, or manipulating the valves. This patented feature permits reseating knockouts and die buttons without loss of time, and a maximum clearance for cleaning and refilling dies, which gives 10% to 20% greater output.



No. 2380
Heavy Duty Hot Plate Press Forged Steel Plates.

Automatic Tablet Machine No. 2638 is provided with Special form of Pressure Regulator adjustable to suit product and accommodate a variety of sizes in tablets. Uniform density assured in large preforms by application of pressure on both top and bottom of material. Can stop at any position of stroke.



No. 2247
Combination Heating and Chilling Unit

For MEDIUM and SMALL PLANTS we offer Self-contained Combination Heating and Chilling Unit No. 2247. The Plates are arranged for steam, gas, or electricity and cold water circulation. Portable Molds for transferring from Heating to Chilling Press. Automatic Cut-out permits operation of either press at will.

CHARLES F. ELMES ENGINEERING WORKS
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Die Hobbing

(*Continued from page 154*)

cept the raised lines, numbers and letters of the graduation; as a conseequence, no two impressions would be exact duplicates and there would be inferior polish. By the hobbing method all lines, figures and letters are brought up sharply and the polish of the hob is imparted to the finished piece.

Chamfered edge knurled knobs are produced by dies F in Fig. 1 and B and D in Fig. 2, requiring no finishing after molding. In Fig. 3 A shows the knob and B and C, respectively, the plan and vertical section of the die with the chamfer hobbed in with the serrations or knurls at one operation.

Machining

The machining method of making a die for these knobs, unchamfered, is illustrated in Fig. 3 where the two-part die is shown in vertical section, comprising a knurled ring E and a base plate F. These fitted together from the die, but it will be noted that the die contains no chamfer; therefore the knob produced will be sharp-edged, as shown in D, Fig. 3, at the angles marked Y. The Knob thus requires some machining after molding to finish it.

Advantages

In the case of this machined die the knurls are either broached or slotted in a separate ring, which is then fitted to a separate bottom piece, F. As a consequence it is impossible to mold a chamfer on the piece. After a short period in service the joint Y between these dies opens slightly, allowing molding material to get between them and form a slight fin, which breaks the corners of the molded piece when ejected. Compare the finished molded piece A in Fig. 3 as it comes from the hobbed die, and the partly finished piece D, Fig. 3, as it comes from a two-part die, necessitating an extra finishing operation to

chamfer each edge at point Y.

Comparison of G, H, and I in Fig. 3 with J and K in Fig. 3 shows the hob seen at E in Fig. 2, and the nearest approach to it that can be made by machining. The object to be molded is a deep circular section with flattened ends. As molded from a machined die the piece would have a knife edge at the ends and require grinding to finish them cut square.

Similarly, compare I and J in Fig. 2, which are hob and die, respectively, for a cylinder having three vertical projections extending a short distance up from the bottom, with the machine die M and N in Fig. 3 for molding the same object, L in Fig. 3.

By machining methods it would be necessary to bore piece N to depth E and then mill away the portion below that line, leaving only the inwardly projecting lugs. This method would require considerable time to machine and polish, whereas by the hobbing method it is possible to form this die at one pressing and obtain a perfect polish.

A hob and die knob more elaborately designed is G and H in Fig. 2, which illustrates how lettering and scalloped edges are brought up at one pressing. From the illustrations here given it is evident that the possibilities of the hobbing method are almost limitless and can be used to advantage in other lines of work beside mold making.

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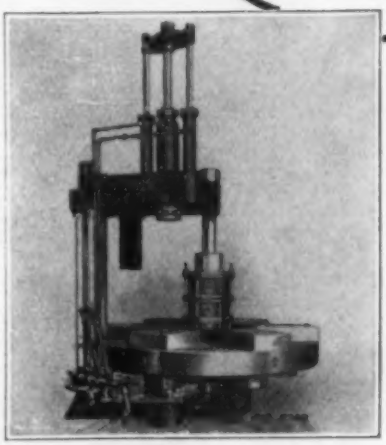

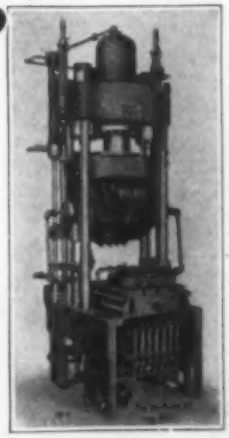

With the rapid expansion in plastic molding, there is need of really efficient machinery for molding in large units such as are illustrated here.

On the left is an H-P-M Composition Molding Press, Six Station Turret Type for such products as storage battery boxes. Among its production advantages over plain single presses are: More production, less investment per unit of output, less labor.

On the right is an H-M-P Bakelite Press, revolving head sliding table type, with Full Automatic Timing Control. It will turn out perfect molded parts with no attention from an operator during the molding cycle. One unskilled attendant can serve several of these presses in placing the raw powder and removing finished parts.

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TECHNICAL ABSTRACTS
AND PATENT REVIEW

RADIO DIAL. Joseph Lupo, Jr., New York. U. S. Patent 1,567,963, Dec. 29, 1925.

A dial including the usual knob and flange portions in which the latter is formed with an annular groove in which an annular indicia bearing element is designed to be removably received. The stations are recorded on a ring-shaped section of paper, covered with a similar section of celluloid, the entire dial rotating as one unit.

AIRPLANE PROPELLER. N. S. Clay, assignor to Westinghouse Electric & Mfg. Co. U. S. Patent 1,567,574, Dec. 29, 1925.

Phenol resins are used to form an airplane propeller from a cord fabric, the resin being then converted into the infusible and insoluble stage by heat and pressure, forming a laminated structure reinforced by longitudinal twisted strands.

TOILET CASE. Helen Hirshbein. New York. U. S. Patent 1,567,735, Dec. 29, 1925.

Toilet case with compartment for holding loose or compact powder, the said compartment being closed by means of an iris diaphram. A rouge holder and mirror are likewise provided.

ELECTRIC INSULATORS. Armand L. Labbe, assignor to American Smelting and Refining Co., New York. U. S. Patent 1,567,277, Dec. 29, 1925.

An acid proof electrical insulator for high-tension work is made by molding a composition consisting of 40% slacked lime, 50% Portland cement and 10% of sand in iron molds and curing the hardened insulators under water for ten days or more, then baking for another ten days at about 140°F. Especially designed for use around smelting works where fumes heavy with sulfurous and sulfuric acid abound.

PANEL AND METHOD OF MAKING THE SAME. Marion M. Harrison, assignor to Miller Rubber Co., Akron, O. U. S. Patent 1,566,863, Dec. 22, 1925.

A panel suitable for radio cabinets, etc., is made which consists in coating wood veneer sheet with a phenol-formaldehyde artificial resin, applying to one surface thereof a sheet of fibrous material, such as paper, juxtaposing a sheet of rubber compound to said fibrous material, and subjecting the laminated sheet thus formed to vulcanizing heat in a suitable mold. Finished panel looks like wood, but has the desired insulating properties.

PRESERVATIVE FOR MOTION PICTURE FILMS. John I. Crabtree, assignor to the Eastman Kodak Co. U. S. Patent 1,568,658, Jan. 5th, 1926.

Films are kept soft and pliable and prevented from cracking and splitting by treating them with a bath consisting of 25 parts ethylene glycol, 2.5 parts of glycerol and water sufficent to make 100 parts.

PHENOL-METHYLAL RESIN. Carnie B. Carter and Albert E. Coxe, assignors to S. Karpen & Bros., Chicago, Ill., U. S. Patent 1,566,817, Dec. 22, 1925.

Methylals, which can be prepared by condensing an alcohol with formaldehyde in the presence of 1 to 2% of hydrochloric acid, are condensed with phenols to form fusible, hard, brittle artificial resins, soluble in alkalies, alcohol, ether and the like. Small amounts of acid are used as catalysts. If desired the products can be hardened by the addition to the resin of formaldehyde, hexa methylenetetramine or similar substance. The properties of the various methylals said to be suitable are: dimethyl methylal, boiling point 42°C., diethyl methylal, b.p.89°C., dipropyl methylal, 137°C, dibutyl methylal, 164°C. As catalysts hydrochloric, formic, acetic or oxalic acid, in amounts from 0.05 to 0.1% are used, the optimum temperature of condensation being 170 to 180°C.

MOLDED BOX WITH PHENOL-RESIN COATED WOOD EXTERIOR. George W. Bulley, assignor to the Miller Rubber Co., Akron, Ohio. U. S. Patent 1,566,815, Dec. 22, 1925.

A box is molded from cellular rubber, with exterior and interior faces of phenol-resin coated wood. A mold having the shape of the outside of the box or cabinet is provided with a cover having a depending core attached thereto designed to form the inside of the cabinet box. Pieces of veneer which have previously received a coat of stain and one or more coats of a phenolic condensation product, are cut to the proper shape and size to fit exactly the walls of the mold. These pieces of veneer are laid in place in their proper positions and a piece of hard rubber compound containing a "blowing agent" (material expanding under heat to make a porous product) is formed into the shape of a box. The whole is then vulcanized. The blowing agent forces the veneered wood against the rubber and welds the whole box into one unit. The chief advantages are seamlessness and very light weight, and at the same time water-proof.

IMPORT DUTIES OF THE UNION OF SOUTH AFRICA. Celluloid Industrie (Gummi-Zeitung), Nov. 27, 1925, 40, 543.

The following articles which are generally classed together with celluloid ware are free of duty: bone, ivory, hoofs, horn, and other raw parts of animals; amber and so-called amberoid also being on the free list. Jewelry including artificial pearls and all imitation jewelry, hat-pins and hat and hair ornaments, etc., pay 30% ad valorem. Smokers articles, which includes cigar and cigarette holders, ash-trays, matchboxes, etc., also pay 30% ad valorem. On the other hand such smokers articles as are not part of complete ware, as for example mouthpieces of pipes made of vulcanite, amber, amberoid, Erinoid, celluloid, Bakelite and horn are free. Cinematographic films, unexposed, are free. All other articles falling into this category and not specifically mentioned are dutiable at 20% ad valorem.

PHONOGRAPH RECORD CONTAINING FIBER - NEEDLE SHARPENING DEVICE. J. Q. Slye, assignor to Standard Appliance and Souvenir Co., U. S. Patents 1,569,402 and 1,569,403, Jan. 12, 1926.

According to the first patent a sharpening groove or track is provided for the turntable of phonographs. This track is lined with emery or carborundum and is in the form of a V, provisions being also made to automatically transfer the fiber needle from the groove directly to the record. The second patent is for a sound record having the sharpening groove as part of the record itself. The record makes about two complete revolutions with the fiber needle in the track when it is switched over to the beginning of the record.

RESINOUS COMPOSITION CONTAINING CHLORINATED RUBBER Norris Boehmer, assignor to Chadeloid Chemical Co.. U. S. Patent 1,572,065, Feb. 9, 1926.

Cumaron resins due to their brittleness are limited in use for coating compositions. This is overcome by the patentee by the addition of chlorinated rubber. The solvents used as carbon bisulfide carbon tetrachloride, benzene, toluene or the like. The material is said to be both acid and alkali resistant.

TOOTH BRUSH WITH DETACHABLE BRUSH HEAD. L. M. Davis, U. S. Patent 1,571,999, Feb. 9, 1926.

Construction details of a tooth brush having a detachable brush head.

MOLDED ARTIFICIAL WOOD. Adolf Foerster. U. S. Patent 1,569,272, Jan. 12, 1926.

90 parts by weight of sawdust and 10 parts by weight of chalk, soapstone or talcum, are thoroughly mixed so that the individual particles of sawdust are entirely enclosed in the chalk. This mixture of sawdust and chalk is then moistened with a solution produced in the following manner: 7 parts by weight of ordinary joiners glue are dissolved in 90 to 95 parts by weight of water and when entirely dissolved 5 to 10 parts of acetic acid is added. This solution is then mixed with an aqueous solution of potassium bichromate in a quantity of from 2 to 3% of the weight of the dry glue. The sawdust and chalk mixture is moistened with the glue solution and the mass worked in full daylight (to render the glue insoluble due to the presence of the bichromate) and then molded under pressure, being kept in the molds for several hours. The product is quite water resistant and can be used for any purpose for which wood is suitable. It is fire-resistant and rot-proof due to the bichromate.

"NON-STATIC" PHOTOGRAPHIC FILM. Earle C. Pitman, assignor to E. I. DuPont de Nemours & Co., U. S. Patent 1,570,076, 1,570,077, 1,570,078; and 1,570,079, Jan. 19th, 1926.

One of the real difficulties encountered in photographic film, and especially with motion picture film. is the tree-like marking produced on the film by small discharges of static electricity which is formed on the film due to friction. Methods of preventing this usually employ some means for rendering the reverse surface of the film more conducting so that the charges of static electricity will leak away and not discharge and fog the film.

The first of the present series of patents, which has no less than 45 claims, deals essentially with the application of a "backing" of cellulose nitrate containing sodium acetate, or glycerol, or saponin. The latter is said to be a "film former," by which the inventor means a substance causing moisture to coalesce to form a film instead of droplets. A characteristic claim is for "a photographic film containing sodium acetate and a film former."

The second patent deals with a "Backing" of cellulose acetate together with glycerol and ammonium acetate, the cellulose acetate used having a combined acetic acid content of 54 per cent, which is lower than the acetic acid content of the base of the film, which is 59 per cent. The film itself is cellulose acetate.

The third patent in a way combines the preceding by applying a cellulose acetate backing, containing glycerol and saponin with a cellulose nitrate main film.

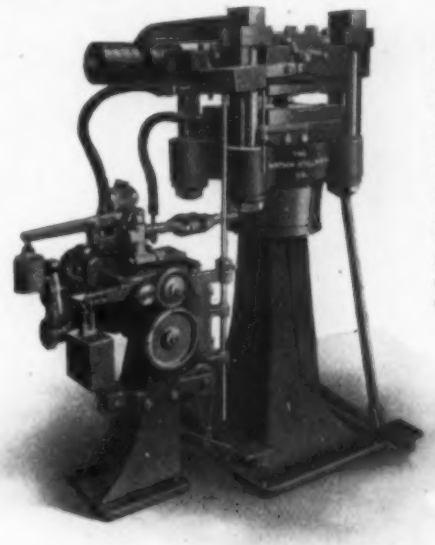
The fourth patent deals with a similar idea, using a cellulose nitrate film as a base and applying starch acetate and glycerol, as the non-static backing. A characteristic claim for the last patent is for "a

WATSON-STILLMAN

Hydraulic Molding Presses

WITH TILTING HEAD

This press is designed primarily to increase the production and decrease labor in the operations involving the molding of plastic materials.



These presses are practically automatic; the application of hydraulic pressure, duration of time of steam and cold water circulation through the dies controlled by the valve mechanism. These automatic features do away with the human element in the timing of the heating and cooling of the dies, thereby insuring a uniformity as well as materially increasing production.

Showing Press with Head Closed

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We are equipped to handle orders for hydraulic equipment in all its many branches from pipe to press including valves, fittings, accumulators, pumps, etc.

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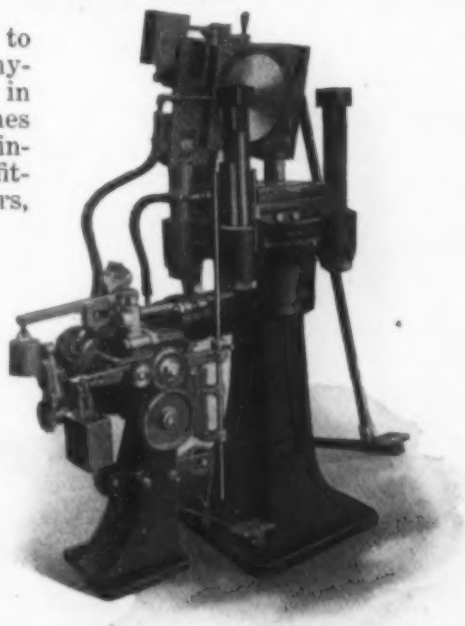

Showing Press with Tilting Head Open

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backing solution for films containing five parts of water-soluble acetate of starch, five parts of glycerol, three parts of alcohol, and 40 parts of water by weight.

RESIN SUBSTITUTE. Erich Freund and Hans Jordan, assignors to Chemische Fabrik auf Aktien (vormals E. Schering), Germany. U. S. Patent 1,750,469, Jan. 19, 1926.

Artificial resins are produced by the Friedel-Craft reaction, using, however, inert surface catalyzers, such as fuller's earth, franconite, tonsil or other hydrosilicates of aluminum and magnesium. Example: Equimolecular proportions of naphthalene and naphthalene tetrachloride are intimately mixed with a quantity of fuller's earth equalling about 0.1 per cent of the total weight. This mixture is slowly heated, and at a temperature of 60° C a vigorous development of hydrochloric acid is started. After two hours heating at 120 degrees C the reaction ends. The product is a dark green resin, bleachable to a golden yellow, softening about 65 degrees C, and soluble in carbon tetrachloride, acetone, ethyl acetate and aromatic hydrocarbons, but insoluble in alcohol. Other condensations can be carried out, such as tetrachoroethane and xylene; and phenols with naphthalene tetrachloride. The latter yields a resin softening at about 80 degrees C, soluble in alcohol.

PLASTIC-MOLDING HYDRAULIC PRESS. T. F. Stacy, assignor to The Hydraulic Press Mfg. Co., Mount Gilead, Ohio. U. S. Patent 1,567,766, Dec. 29,(1925.

Hydraulic press so designed that the upper platen with its tilting press head does not have any longitudinal movement during the pressing operation, the pressing being performed entirely by the movement upward of the lower mold-supporting table, which is provided with automatic knock-out means. When the table is in the lowest position it may be given a movement to the front to bring it into a more accessible position

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SOUND RECORD. F. L. Dyer, U. S. Patent 1, 570,297, Jan. 19, 1926.

The sound grooves are made very much smaller and the record run

(*Continued on page 174*)

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Bakelite Extends its Trade Mark Protection Still Further

The word "BAKELITE" as a trademark for frames and ornaments for pocketbooks and handbags; harness buckles and trimmings, as well as for clothes brush, hairbrush, nailbrush, and toothbrush backs and handles; and shaving brush and paint brush handles, has been applied for by the Bakelite Corporation under dates of October 23d and 28th, 1925. The newly adopted "infinity sign" trade mark as applied to clutch facings, brake linings and bushings for water-tight and gas-tight connections was applied for on July 3, 1925.

Other products to which the name Bakelite is to be applied as a trade-mark are: Billiard balls, bowling balls, fishing reels, pool triangles, dominoes, game counters, dice, jackstraws, chessmen, checkers, Chinese domino blocks (evidently Mahjong tile), golf-ball cores, and golf-club heads (applied for October 23, 1925); handles of ferrules and canes, umbrellas and parasols (October 23, 1925); grinding wheels and cutting wheels as well as clutch facings, brake linings and bushings (October 28, 1925).

The application of Bakelite is evidently still on the increase.

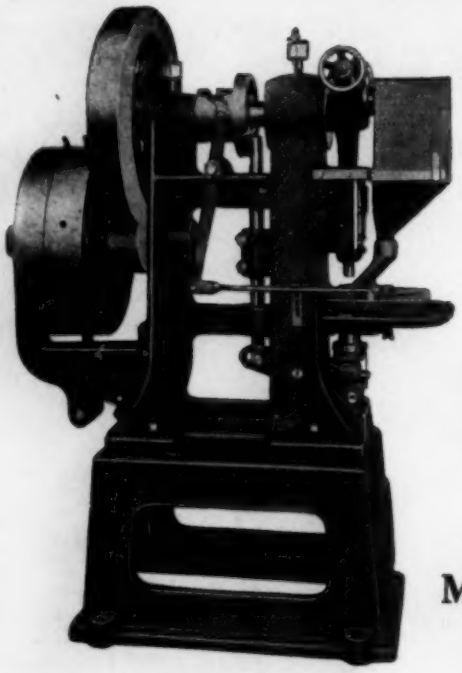
Mirror Display

Unusually interesting was a window display on mirrors, recently shown by Myers, Winnipeg, Canada. All the hand mirrors save one in the display were laid face downwards on the white silk-draped floor. This enabled the woman prospect to appreciate the beauty of the ivory, amber and shell specimens on exhibition. From the central part of the ceiling, and halting about on a level with the average eye, an ivory hand mirror was suspended on a white satin ribbon chain. The woman looking into this mirror saw her own face reflected in it. Nothing particularly striking, but because the backs of the other mirrors stood out, it commanded attention.

FJS FJS

STOKES

Bakelite Preforming Machine



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(*Continued from page 172*)

slower, about 16 r.p.m., and the sound is reproduced by running a fine stylus in the small grooves, allowing it to actuate a microphone and amplyfying the sound by the usual type of electron tube dvices. Records running as long as 75 minutes can thus be produced.

PLASTIC COMPOSITION AND PROCESS OF MAKING THE SAME. Oscar Frosell, assignor to Williamsport Building Products Co., U. S. Patent 1, 572,714, Feb. 9, 1926.

Although made from the usual magnesia cements, the process of producing the article employs both heat and pressure. Hydrated magnesia is mixed with fillers and enough ammonium chloride solution is added to convert any calcium salts into material capable of setting. A preferred mixture is nine volumes of magnesium oxide, two parts of asbestos, four parts kieselguhr, one part wood flour impregnated with China wood oil, six parts ordinary wood flour, 24 parts oak sawdust, 32 parts pine sawdust, one part ochre. To this are added 32 parts of ammonium chloride solution of 1°Be strength. Articles are molded from this at a pressure of 1,500 to 1,600 pounds per sq. inch and the material then steamed for 20 minutes at 80 lbs. pressure. The molds are cooled by application of cold water. Usually about ten minutes suffice.

COMB. Bernard Marx Schweizer, U. S. Patent 1,572,411, Feb. 11, 1926.

A comb having the back so constructed that it may be quickly and thoroughly cleaned, the back being movable to permit a jet of water to be forced between the teeth at their junction with the back.

CELLULOSE ACETATE FILM COMPOSITION. Stewart J. Carroll, assignor to Eastman Kodak Co., U. S. Patent 1,572,232, Feb. 9th, 1926.

Tributyrin is used as a plasticizer for the cellulose acetate. Example: 100 parts of acetone-soluble cellulose acetate are dissolved in 300 to 500 parts of acetone together with 10 to 35 parts of tributyrin. The films made from this are very flexible and do not become brittle on incubation at 65 degrees C for a month.

CELLULOSE ESTER PLASTICIZER. Jean Altweg and Edouard Fau Chermette, assignors to Societe Chimique des Usines du Rhone, Paris, France. U. S. Patent 1.572,176, Feb. 9, 1926.

The patent concerns itself with the manufacture of acetonphenone-glycerol condensation products, such as for example condensation products of poly-alcohol such as glycols, glycerol, erythrol, mannite, glycerol-chlorohydrin, glycerol esters and the like, with ketones such as acetphenone, propiophenone and their derivatives. The interesting part from the plastic viewpoint is that most of the condensation products are said by the patentee to be excellent solvents and plasticizers of the cellulose esters, and suitable for use in films and plastic products.

Pyroxylin Products Safe to Handle

(*Continued from page 165*)

when the articles are also wrapped in tissue paper or in corrugated paper, are quite safe. In one case, however, when such material was shipped in bags, the shipment was classified as combustible.

Film is very rarely shipped in carload lots. Usually the shipments are relatively small. Unexposed films, and exposed films for development, are usually packed in wooden boxes with a sliding cover. It is necessary to mark such shipments as "photographic film." No particular precautions need be taken, although some railroads insist upon segregation of the shipment.

In adjudging the means of shipping celluloid scrap. it should be mentioned that not only Germany, but most other countries, allow the handling of such material in bags. Chechoslovakia, however, insists upon cases or kegs. In case of carload lots of scrap celluloid, tightly closed boxcars are required. As this material is quite bulky, the actual weight of such a car is seldom much over 10,000 lbs. That the German railways do not consider celluloid particularly dangerous is evident from the tone of the official regulation, which reads: 'Celluloid scrap and film waste should, when sent by freight, be packed in packing cases, tubs, barrels or tightly enclosed in linen or canvas bags'."

(*Continued on page 177*)

Does the Box Sell the Set?

A sales problem

See

PLASTICS

for

June, 1926

for **MOLDING** *and* **CURING** *all* **PLASTIC MATERIALS**

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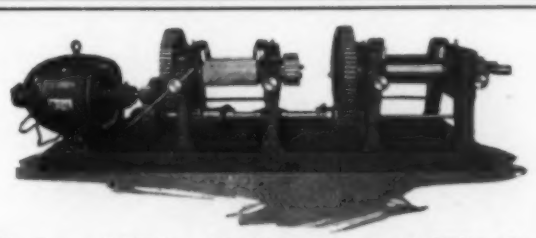

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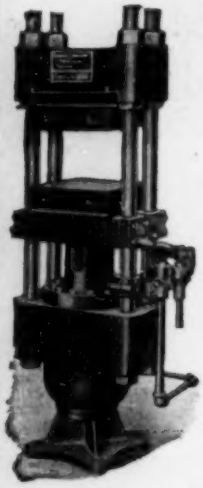

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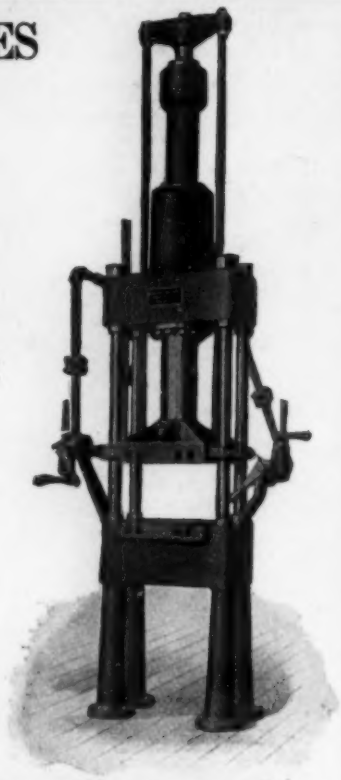

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Upright Sensitive Drill

A quick operating Sensitive Drill for light manufacturing of celluloid articles and radio parts. Drill is operated with a foot lever, leaving both hands to guide or handle work.

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Power Jig Saw

Our Jig Saw is made in 2 sizes:

No. 1, 9" swing between saw and arm, $50.00.

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These Saws are suitable for celluloid plastic materials, wood, fibre and soft metals.

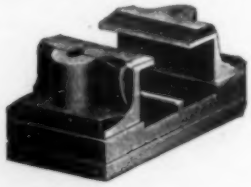
A Handy Machine in Any Factory

Standard Tool Company, Leominster, Mass.

Dressing Combs

(*Continued from page 166*)

There should be a hole and plug in the box to draw off the slush when the ball is not running. The ball should be hooded over at the sides, top and back as much as possible and allow the operator to reach around it freely.



Iron Double Plug Holders

Rubbing Tongs can be used to advantage in holding some kinds of work while rubbing, but the operator holds most of the work in his hands and rubber cots can be used to protect the fingers.

Completing the Comb

After being rubbed the combs are polished on balls made and used same as the rubbing balls, excepting that they are made of cotton cloth and about one-half the surface of the ball is coated with rotten stone and oil and the rest of the ball is left clean. No box underneath or hood is required. A piece of rotten stone is allowed to soak in lard oil and is then held on the ball while in motion and then a piece of dry rotton stone is applied to the same place to complete the coating. The piece to be polished is first held on the coated and then on the uncoated part of the ball. There should be an upright board with end fastened to floor in front of the ball to protect the operator from dust from the ball.

If the large outside teeth at far away from the others, they the ends of the comb stand too may be bent back to place after first heating the end teeth only in hot sand.

The combs are now completed.

Pyroxylin Products Safe

(Continued from page 175)

To this it may be added that in the United States, moving picture film is invariably sent out in tin cases holding individual reels, and that its transportation on passenger trains and its handling on subways and railway stations is illegal. A review of American regulations for handling pyroxylin materials will be given in a forthcoming issue of PLASTICS.

BOOKS

Synthetic Resins and their Plastics.
Carleton Ellis. 514 pages, illustrated. $6.00.

The book will serve as a guide and prove a stimulus to the numerous investigators and practitioners in the field of artificial resins. The section of plastic molding is especially valuable.

Plastics and Molded Electrical Insulation.
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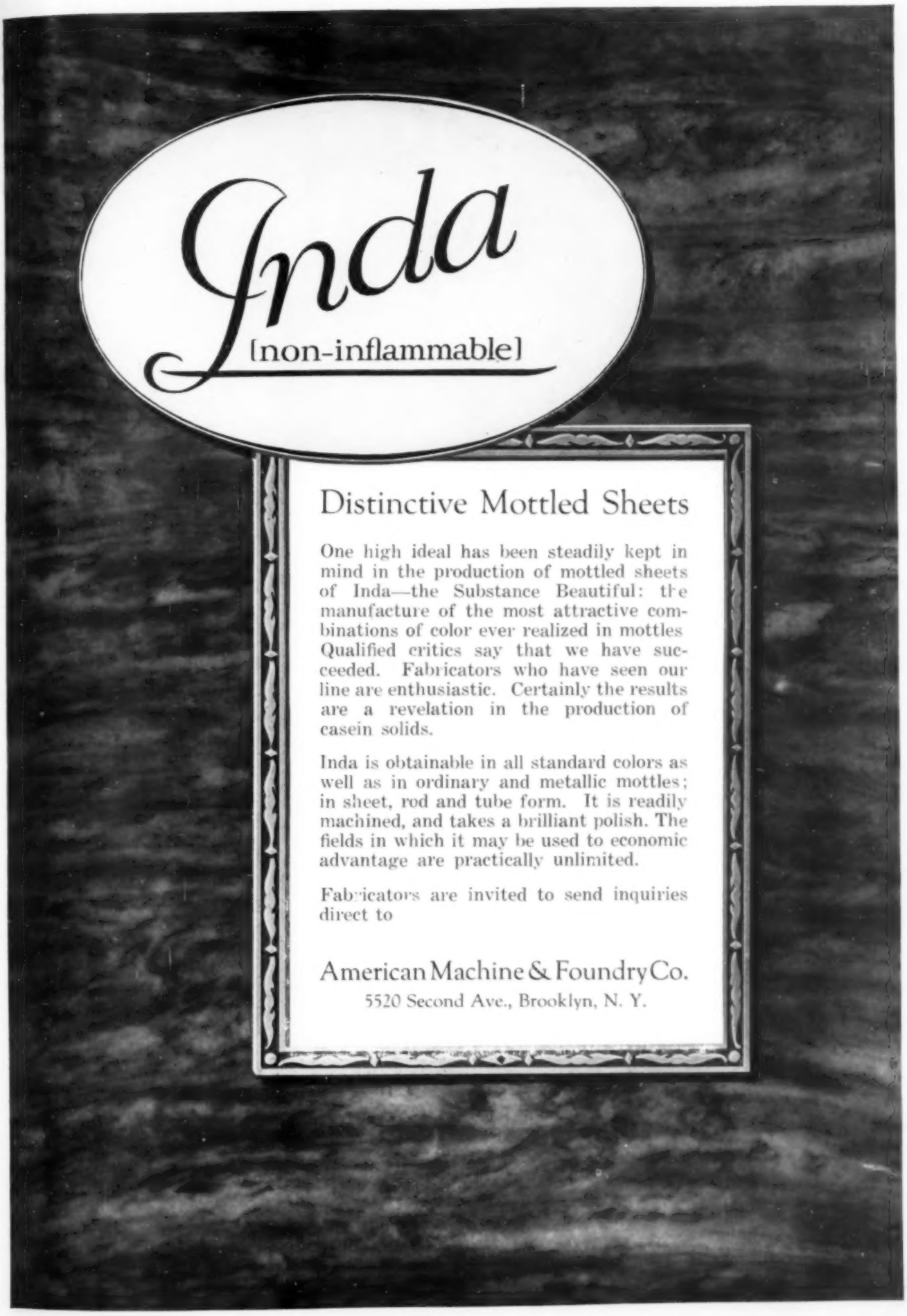
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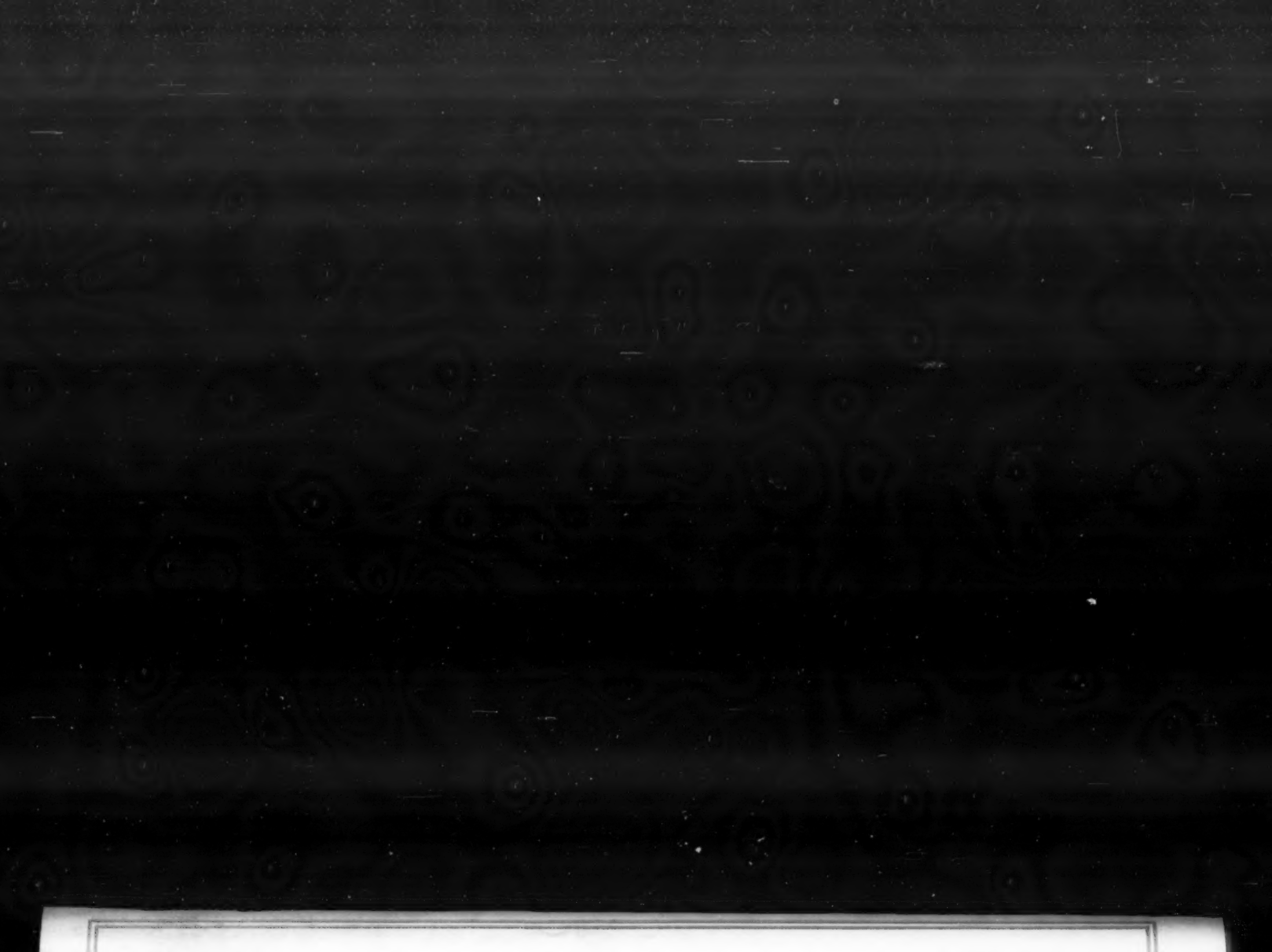
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